

**EXECUTIVE OFFICE OF ENERGY AND
ENVIRONMENTAL AFFAIRS**

DAM AND SEAWALL REPAIR OR REMOVAL FUND

ANNUAL REVIEW

FISCAL YEAR 2014

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EEA thanks the student interns who offered assistance in a variety of ways to help launch the Dam and Seawall program in this critical first year:

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AUTHORITY: The Dam and Seawall Repair or Removal Fund was adopted by the General Court and signed into law by Governor Patrick in 2013 to promote public health, public safety, and ecological restoration. The legislation was passed in response to growing recognition of the need to address the significant infrastructure issues related to dams and seawalls. A 2011 State Auditor's report identified 100 relatively large dams in unsafe or poor condition with an estimated \$60 million in remediation costs needed to reduce the likelihood of dam failures. A 2007 Coastal Hazards Commission Report and a 2009 Department of Conservation (DCR) Coastal Infrastructure and Assessment Project assessed the coastline, including state and municipally owned structures. The DCR assessment identified over \$626 million in rehabilitation costs.

Under the authority created by M.G.L. c. 29, §2III and regulations issued under 301 CMR 15.00, EEA enters into contracts with qualified organizations to implement projects for the repair and removal of dams, levees, seawalls, and other forms of flood control.

The Fund addresses the growing need to repair dams, coastal flood control structures and inland flood control structures that pose a risk to public health, public safety and key economic centers. The Patrick Administration is committed to proactively addressing these risks before disaster strikes, and sees increasing the resiliency of the Commonwealth's infrastructure as particularly important in the face of increasingly extreme weather as a result of climate change.

As described in more detail below, EEA provides funding in the form of grants and loans to finance the costs to rebuild, remove or refinance structures falling into one of the three categories of structures cited in the law: dams or similar unregulated structures; coastal infrastructure; and levees. By allowing EEA to institute a loan program, the funds could be recycled following the completion of one project and provide additional funding for other projects in future years without requiring additional legislative approval.

IMPLEMENTATION: Per chapter 29, sec 2III, an initial contribution of funds from the Water Pollution Abatement Trust (WPAT) was transferred to the program, resulting in \$20.1 million credited to the fund, and the account was further divided into two equal parts – one part for dam projects, the other for coastal and levee projects.

The law specified that applications must be accepted on or before September 1 of each year and that EEA develop and implement regulations to guide the prioritization and selection of funded projects. EEA developed regulations through a public process in the spring and into early summer of 2013. Working first through an interagency committee, EEA drafted regulations and then held a series of

public hearings to gain feedback and recommendations for revisions. The regulations were published in July 2013¹. In keeping with the authorizing law, key initial priorities were established:

- The structure has been classified by DCR as a High Hazard or Significant Hazard Dam in poor or unsafe condition²;
- The Coastal Flood or Wave Control structure has been rated in fair, poor or critical condition (C-F) according to the five level condition rating system in the Massachusetts Coastal Infrastructure Inventory and Assessment Project, as published by DCR;
- The structure has been identified in writing by the United States Army Corps of Engineers as requiring imminent infrastructure improvement.
- Structure is owned by a municipality
- Structures is owned or operated by charitable organizations.

Other funding priorities were developed for each of the three categories of structures cited in the law. Overall, the emphasis in selection is on public health and safety, ecological restoration when possible, and the readiness of the applicant to implement the project.

AVAILABLE FINANCING: As mentioned above, funding is available to eligible applicants for both grants and loans. Eligible applicants vary according to the category the structure, with the categories defined by the regulations. The primary distinction is that, as authorized by the law, private dam owners are eligible for funding, but only to receive loans for project costs. As the funds are public monies, part of the review process is to ensure that the public benefit of the project exceeds the private gain received by the private owner. In many cases, the downstream threat to life and property is significant should a privately held dam suffer an unexpected breach. Privately held coastal structures or levees are not eligible for funding.

The actual awards are commonly offered as a finance package of both grant and loan. The grant portion is paid as a reimbursement for certain aspects of the project, in most cases the final design, permitting, and preparation of the bid package. Once the “shovel is in the ground”, those construction costs are funded through a loan to the applicant, repayable over a 20-year period.

As defined in the regulations, the interest is fixed at the time the loan is fixed over its twenty year life, though the available rate will float with the market each application period. For the awards made during fiscal year 2014, most loans were set with an interest rate of 2 percent. This compares favorably with current market rates to municipal borrowers of approximately 3.75³ percent. A private structure owner would receive this same advantageous rate if funded.

In the development of the regulations, it was noted that ecological restoration was an underlying priority of the legislation. To that end, the regulations reflect that, should the completion of the

¹ The regulations guiding implementation of the Fund may be found at <http://www.mass.gov/eea/docs/eea/wrc/cmr-301-15-00-final-final.pdf>.

² In accordance with Massachusetts General Laws Chapter 253 Sections 45 and 46

³ Estimated based on market research conducted 16 April 2014 for a community with an AA or equivalent rating. ⁴ The Environmental Bond does not authorize loans to be issued for this purpose.

project improve/expand use of naturally occurring systems, the loan portion of the award will be provided at a 0 percent interest rate. This creates a financial incentive to applicants to consider not only the long term costs of reconstruction, but also the ongoing operations and maintenance costs. In many cases, the better financial option is also the better choice for the ecological health of the area. Applicants are encouraged to consider that many structures were built for a different time and purpose and that today the useful purpose of the structure has passed.

FIRST ROUND APPLICATIONS RECEIVED: According to the authorizing legislation, applications were due on or before September 1. With the regulations finalized, the application documents were published. Within the few weeks remaining, 63 applications requesting over \$70 million dollars had been submitted to EEA's office for consideration!



Even with just a few weeks to apply, over 60 applications were submitted, demonstrating the tremendous demand for funding assistance.

Of the 63 applications received in fiscal year 2014, eight proposed structure removal, requesting a total of \$2,614,017 toward overall anticipated project costs of \$4,321,040. Of the 12 awards made, five projects were for the removal of structures. Each removal project selected was from Category 1 (Dams and similar unregulated structures). To these projects, the Fund has committed financing of \$1,208,217 toward overall anticipated costs of \$2,841,620.

Application Category	Applications Received	Funds Requested	Matching Funds Offered (cash and/or in-kind)
Category 1: Dams and similar unregulated	39	\$20,135,408.00	\$6,507,040.00
Category 2: Coastal	23	\$49,827,810.24	\$10,493,643.00
Category 3: Levees and similar	1	\$730,000.00	\$0.00
Total	63	\$70,693,218.24	\$17,000,683.00

Table 1: Summary of FY 2014 Applications Received

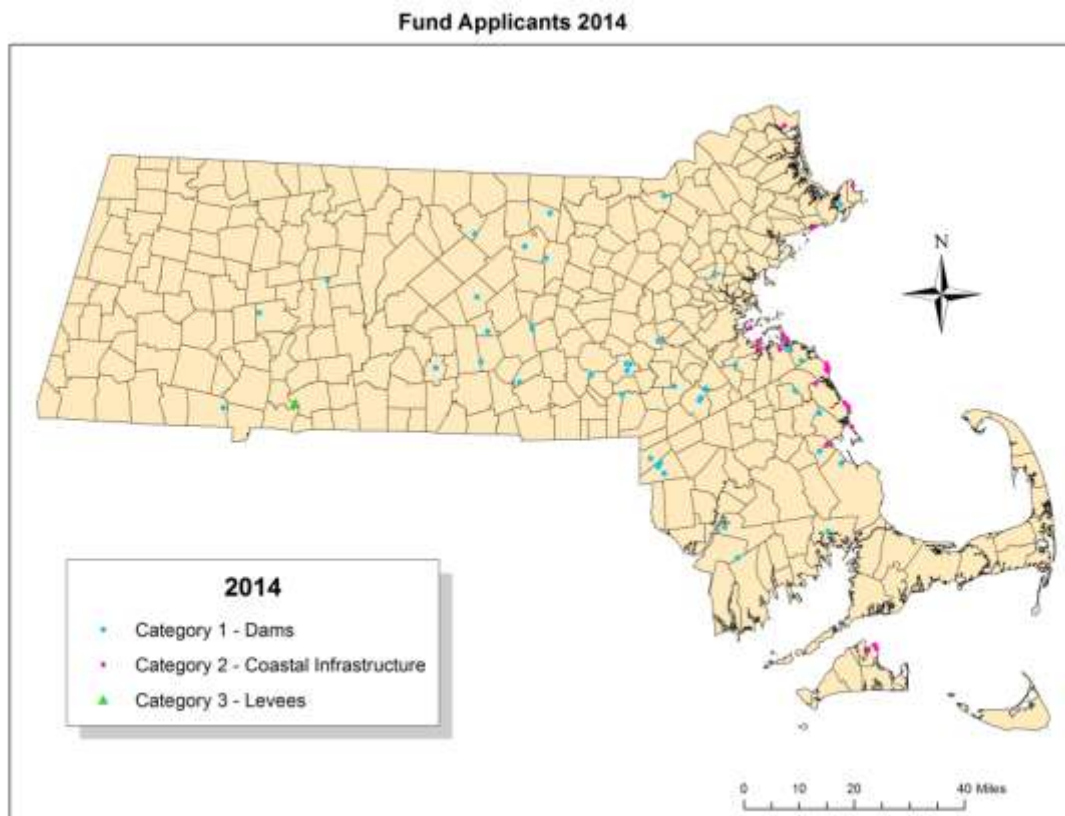


Figure 1: Structure Location

Those structures for which funding was sought in the first round of applications under the new Dam and Seawall Repair or Removal Fund are depicted here.

AWARDS ANNOUNCED: On January 13, 2014, Senate President Murray and other legislators joined Secretary of Energy and Environmental Affairs Richard K. Sullivan Jr. and representatives from many Massachusetts' municipalities for announcement of the first awards. The Town of Plymouth hosted the gathering in its Town Hall. Secretary Sullivan announced that funding would be made available to a number of communities for critical projects, and that the Patrick Administration also committed, as part of its efforts to address climate change adaptation, to bolster the funds available by financing the coastal projects from the state's environmental bond. This carried two significant implications: 1) the monies from the Fund were not used to pay for coastal projects in this application round, thereby extending the life of the Fund for future projects; and 2) these recipients would receive their project support solely as grants, not as loans which would have to be repaid⁴.

Applicant	Category 1 Awards: Dams and Similar Unregulated Structures		Outside funds leveraged
	Grant	Loan	
Plymouth	\$0.00	\$636,000.00	\$636,000.00
Lancaster	\$0.00	\$86,000.00	\$86,000.00
Westfield	\$0.00	\$0.00	\$0.00
Worcester	\$240,000.00	\$740,000.00	\$740,000.00
Brookfield	\$6,750.00	\$66,942.00	\$66,942.00
Northampton	\$75,000.00	\$161,000.00	\$161,000.00
Canton	\$665,000.00	\$1,000,000.00	\$1,000,000.00
Bellingham	\$188,000.00	\$700,000.00	\$700,000.00
Fall River	\$46,474.00	\$10,403.00	\$10,403.00
Wareham	\$164,995.00	\$200,000.00	\$200,000.00
Gloucester	\$146,400.00	\$300,000.00	\$300,000.00
Holliston	\$73,500.00	\$0.00	\$636,000.00
Total	\$1,606,119.00	\$4,335,942.00	\$3,928,345.00
Table 2: Summary of Category 1 Funds Awarded			

⁴ The Environmental Bond does not authorize loans to be issued for this purpose.

Applicant	Category 2 Awards: Coastal Infrastructure	Outside funds leveraged
Oak Bluffs	\$ 3,600,000.00	\$ 0.00
Hull	\$ 2,750,000.00	\$ 0.00
Rockport	\$ 14,000.00	\$ 1,150,000.00
Marshfield-Hewitts South	\$ 488,000.00	\$ 29,960.00
Marshfield-Hewitts North	\$ 760,000.0	\$ 0.00
Total	\$ 7,598,000.00	\$1,1679,960.00

Table 3: Summary of Category 2 Funds Awarded

No applications were selected for funding under Category 3 (Levees).



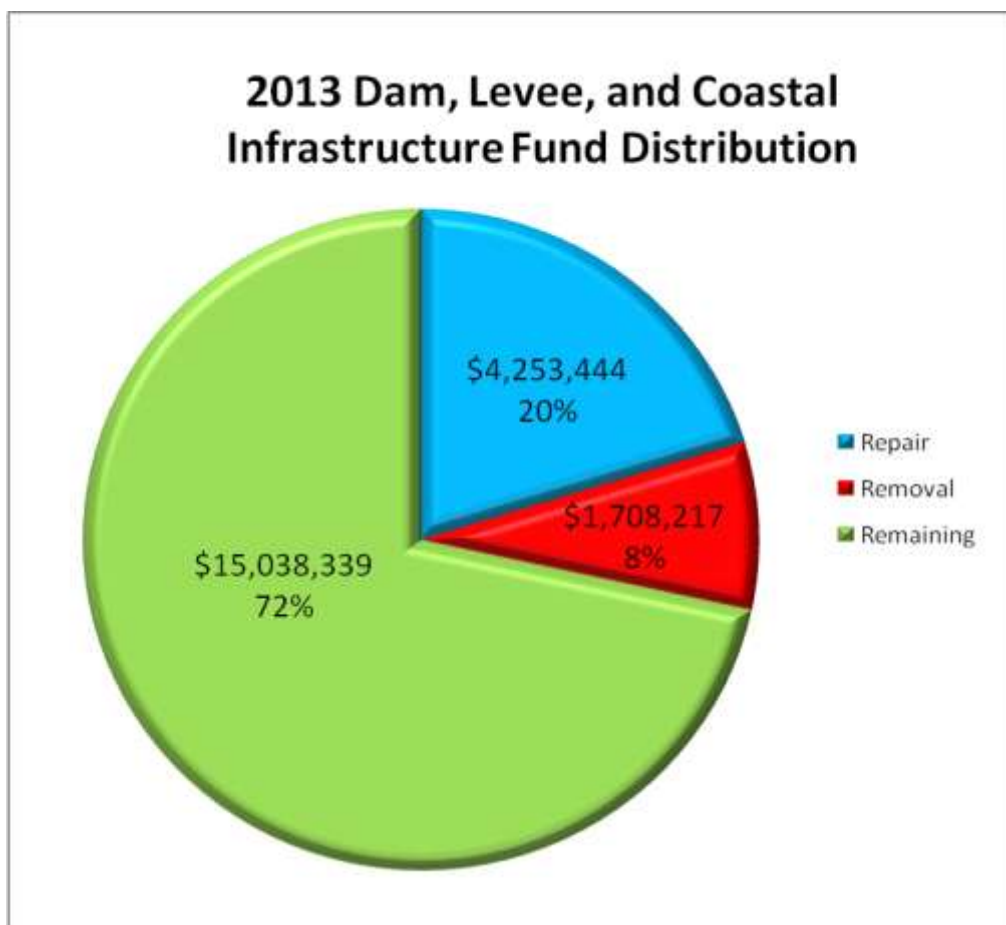
On January 13 2014, Senate President Therese Murray (D-Phymouth) joined Secretary Richard Sullivan and other area legislators in Phymouth to announce the first awards.

CURRENT STATUS OF AWARDS: During fiscal year 2014 contracts were executed and work is now underway on the following projects:

Category 1: Canton, Fall River, Holliston, Lancaster, Northampton, Westfield.

Category 2: Hull, Oak Bluffs, Rockport

Assuming all 2014 awards will eventually lead to a contract, the Fund has a remaining balance in each of its two primary sub-accounts. As of June 30, 2014, for dams and similar unregulated structures \$4,038,339 is available for further project support. In the coastal infrastructure and levee sub-account, the full \$10,050,000 remains. Any interest earned on project investments made will be equally divided between the two sub-accounts, in accordance with the regulations developed to reflect the intent of the original law.



QUICK RESULTS:

One project yielded quick results both for the program and for the environment. The Town of Lancaster was awarded funds to remove a dam on the Wekepeke Brook, adjacent to the Robert Frommer Conservation Area. The structure had generated power for an adjacent chair factory. Over time, the factory closed and the structure fell into disrepair. In time, the town took over ownership of the dam and determined that removal was far more cost effective than continuing upkeep.

To celebrate this first removal of a structure sponsored the Fund, state and municipal officials



Secretary Maeve Vallely Bartlett joins Representative Harold Naughton and Orlando Pacheco in celebrating the successful restoration of the Wekepeke Brook.

gathered on June 24, 2014 at the site. The removal, finance by a loan to the town issued by the Fund, and with technical assistance provided by the Massachusetts Department of Fish and Game (DFG) Division of Ecological Restoration (DER), became an appropriate backdrop to recognize River's Month in Massachusetts. The removal created the return of natural free-flowing conditions of the brook and provided access to 18-miles of newly accessible upstream habitat for brook trout and other native species. Within just five weeks of the dam removal, sediment mobilization had begun and channel reformation became

evident. Further, DFG's Department of Fish and Wildlife (DFW) confirmed that brook trout, ranging in size from 57mm to 231 mm were found in newly opened habitat. Further upstream 13 brook trout ranging in size from 47 mm to 176 mm were found. This represents 4 – 5 year classes of brook trout in the restoring channel of the Wekepeke.



With financing from EEA now in place, the removal of the Bartlett Pond Dam was completed restoring the Wekepeke Brook in Lancaster.

ROUND TWO: The application documents for the second round were released to the public on April 3, 2014. The application period closed on June 17, 2014. The application period was adjusted earlier into the year to give municipal recipients an opportunity to secure borrowing authority at their fall town meeting, if held, helping to shorten the time lag between award and project implementation. Under this revised schedule, still in keeping with the directive of the legislation, projects are more likely to begin in the spring rather than later, after a spring town meeting authorizes the borrowing portion of the financing. If designs and permitting can be accomplished over the winter months, construction can begin as the spring thaw arrives.

While there were fewer applications than the previous year, the demand for funding well outweighs available sources. Of the 18 applications for Category 1 structures, two were for removal versus 16 for repairs. All of the 8 coastal applications were for rehabilitation of existing structures. Two applications, both from Category 1, were deemed ineligible.

Application Category	Applications Received	Funds Requested	Matching Funds Offered (cash and/or in-kind)
Category 1: Dams and similar unregulated	18	\$12,447,900.00	\$3,270,913.00
Category 2: Coastal	8	\$22,259,667.50	\$149,881.42
Category 3: Levees and similar	0	\$0.00	\$0.00
Total	26	\$34,707,567.50	\$3,420,794.42

Table 4: Summary of FY 2015 Applications Received

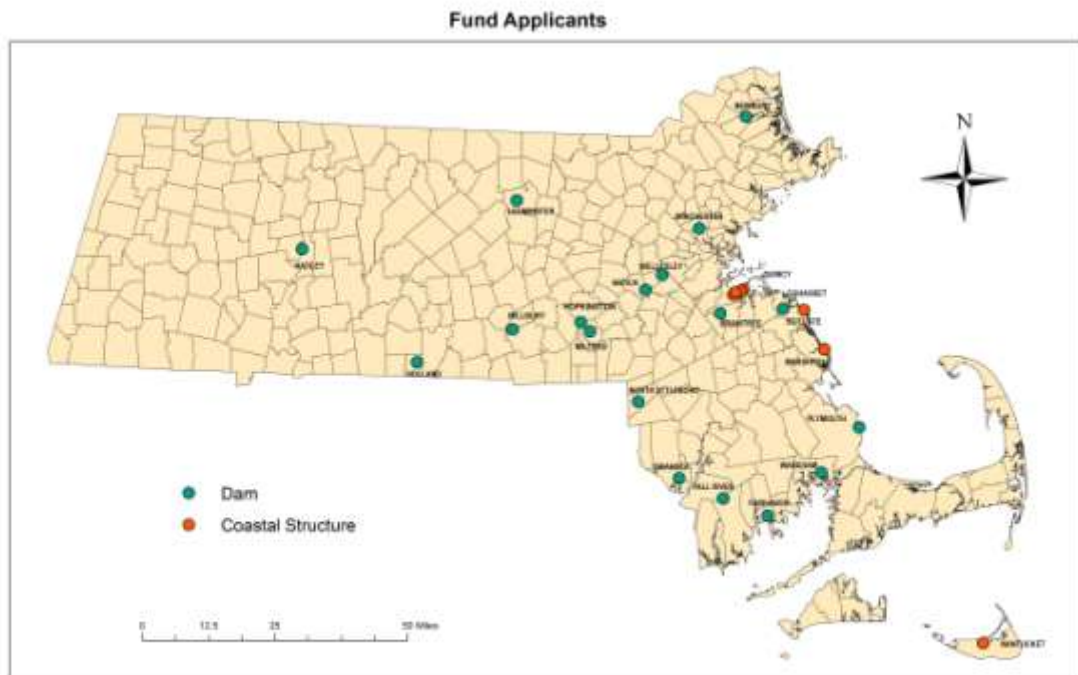


Figure 2: Structure Location

Those structures for which funding is sought in the second round of applications under the Dam and Seawall Repair or Removal Fund are depicted here.

CLOSING REMARKS: The Dam and Seawall Repair and Removal Fund has quickly demonstrated its ability to serve the Commonwealth in a number of ways, primarily:

- addressing needs to repair structures where failure would likely cause loss of life and/or serious damage – especially structures vital to the protection of essential public infrastructure, commercial and population centers, protection of tax revenue generating structures and infrastructure necessary for the supply and delivery of public utilities and emergency response activities;
- providing a source of funding to remove those structures whose useful purpose has passed;
- offering incentives to remove obsolete structures, and thereby improving or expanding the functions of naturally occurring systems;

While the Fund has many valuable projects underway, it is limited in its ability to address the Commonwealth's needs. The volume of applications alone, and the funds sought through those applications, identifies an inability to meet the demand made upon the program by applicants. Further, independent studies on dams and coastal infrastructure have verified a need far beyond what the Fund can currently support. In 2001, for example, the Auditor of the Commonwealth

evaluated the need for dam repair and maintenance and estimated remediation costs of \$60,000,000 for municipally owned dams throughout the state⁵.

In 2009, DCR's Office of Waterways published the Massachusetts Coastal Infrastructure and Assessment Project, citing a financial need of \$626,798,185 (in 2006 dollars) to bring existing coastal structures back to compliance with their original design. "Based on the proposed spending plan, approximately \$31.5 million will be needed each year to meet the 20-year repair plan."⁶ Such rehabilitation would not take into account any recommended additional fortification considered important in the wake of current projections regarding the impact of climate change to our coastal areas. With a coastline longer than that of the State of California, significant public health, utilities and emergency responder access issues will only increase over time.

There has also been great patience and cooperation among many parties in and out of government. From the many advocates who worked tirelessly to bring the law into the Governor's desk for his signature, to the varied professionals in the engineering community and financial advisors who helped guide both this office and their municipal clients in the refinement of the financial documents needed to launch the loan program, to the other state agencies and non-profit groups who continually help promote environmental restoration, the advance of the fund is a team effort.

INDICATIVE SUMMARIES: Below find summaries of each project awarded funding in January 2013, applicants to the first round, based on the original application submitted by the structure owners.

⁵ Local Impact Financial Review: Massachusetts Dam Safety Law. Auditor of the Commonwealth, 2011.
<http://www.mass.gov/auditor/docs/dlm-municipal/dlmdamsafetyreport.pdf>

⁶ Massachusetts Coastal Infrastructure and Assessment Project. Department of Conservation and Recreation, 2009.
<http://www.mass.gov/eea/docs/czm/stormsmart/seawalls/public-inventory-report-2009.pdf>

Indicative Project Summaries

Dam and Seawall Repair or Removal Fund

Category 1: Dams and similar regulated and
unregulated impoundments

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- v. [City of Gloucester](#)
- vi. [Town of Holliston](#)
- vii. [Town of Lancaster](#)
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- ix. [Town of Plymouth](#)
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II. Category 2: Seawalls, coastal flood and/or wave control structures

- i. [Town of Hull](#)
- ii. [Town of Marshfield](#)
- iii. [Town of Marshfield](#)
- iv. [Town of Oak Bluffs](#)
- v. [Town of Rockport](#)

Applicant:	Town of Bellingham
Project Title:	Old Mill Dam Removal
Location:	Charles River, Bellingham
Repair or Removal:	Removal

Description: The Old Mill Dam, located on the Charles River in Bellingham is on the Massachusetts Dam Safety Law list of 100 Critical Municipally Owned Dams. This dam is in poor condition due to severe deterioration of the concrete at the combined low level outlets and spillway structure. Additionally, the dam has also been found to have other areas of dam safety concerns including apparent sinkhole development, growth of unwanted vegetation, potential scour at the spillway toe, and the concrete and stone retaining walls are in poor condition. The Town of Bellingham has conducted studies and evaluations for both the repair and the removal of the Old Mill Dam. They have reasoned that the Old Mill Dam is an aging piece of infrastructure that provides limited purpose to justify the cost associated with continued operations and maintenance.

The removal of this dam is cost-effective in the interest of preserving public safety and environmentally sound. As with most dams, the Old Mill Dam lacks provisions for wildlife passage, making the dam and spillway an obstacle to habitat connectivity and fish passage as well as impacts the water quality along the Charles River. The removal of this dam will reconnect more than four miles of stream channel along the Charles Rivers and tributary streams and rivers, providing for a great feat in ecological restoration.

This project has two phases; (1) Impoundment Area Restoration and (2) Dam Removal. The first phase entails removing and disposing of contaminated sediment, restoring the natural stream channel and vegetating areas of soil exposed by draining the impoundment and dredging. The second phase consists of the construction activities associated with the removal of the dam as well as the gradation of slopes. This was awarded \$500,000 through the Dam and Seawall Repair and Removal Fund.

Project Cost:	\$1,000,000
Funds Requested from EEA:	\$500,000
Funds Awarded	\$188,000 in grant \$312,000 in loan
Other Funding:	N/A
Anticipated Project Completion:	Summer 2016



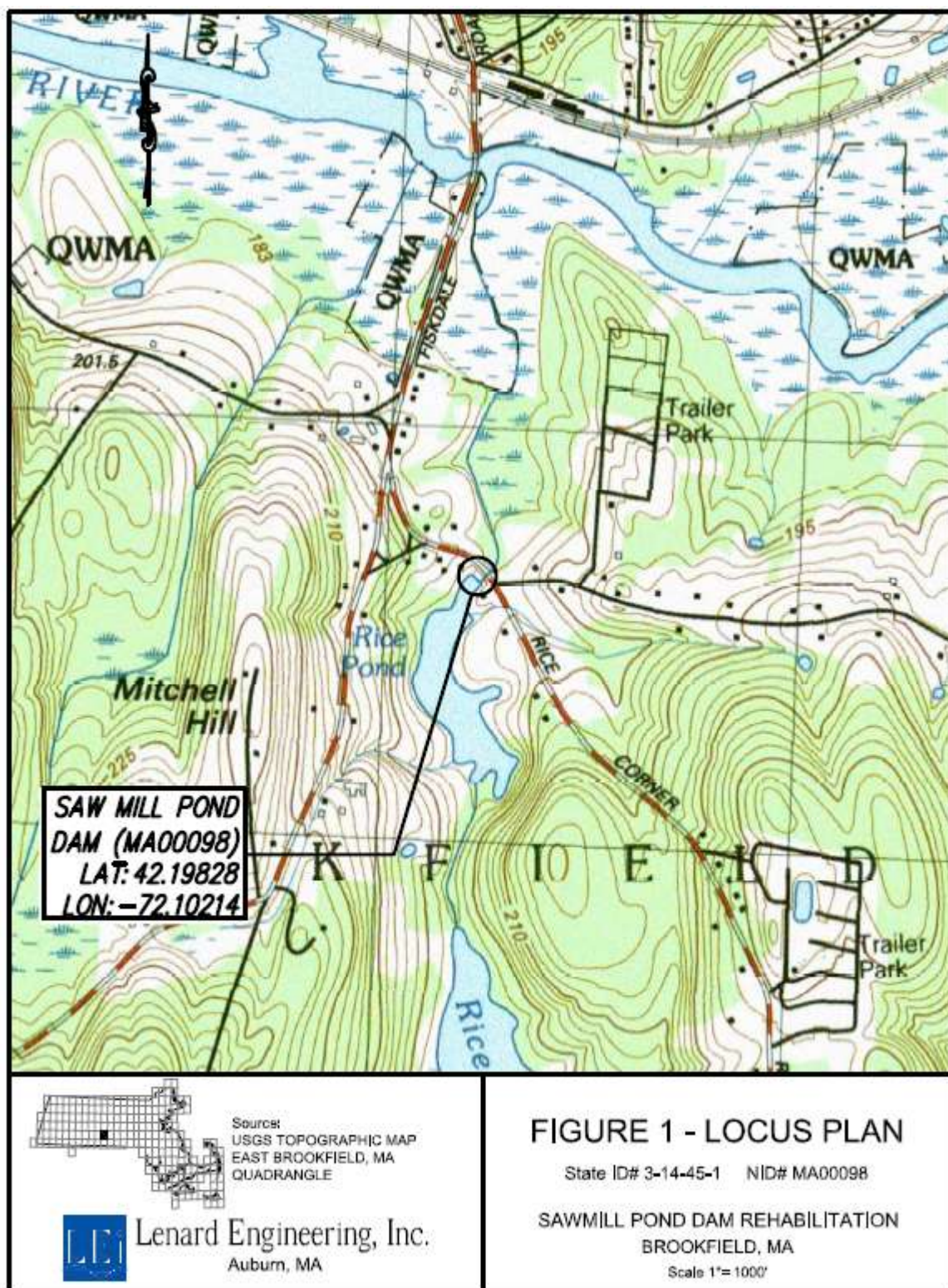
Applicant:	Town of Brookfield
Project Title:	Saw Mill Pond Dam Design
Location:	Saw Mill Pond Dam, Brookfield
Repair or Removal:	Repair

Description: The Saw Mill Pond Dam, as inspected and deemed by the DCR Office of Dam and Safety, does not meet safety standards and is a potential threat to public safety. This dam has a lack of visible low level outlet control, deterioration of the exposed low level conduit, the presence of dense woody vegetation on the downstream slope, steep downstream channel slopes, a deteriorated left downstream stone masonry training wall, undulations on the left downstream shoulder, and a sinkhole on the right upstream shoulder over a deteriorated roadway drainage pipe. Leakage was also observed through the abutment weepholes along the spillway channel. The dam crest consists of the public way of Lake Road; should a breach of the dam occur, the safety of residents on Lake Road and areas downstream would be jeopardized.

The Saw Mill Pond Dam Repair Project is designed to address the safety issues of the dam; namely the lack of a functional low level outlet, undulations and failing masonry walls in the downstream slopes and sinkholes developing along the crests downstream left shoulder. The repairs outlined in this project will address the concerns of DCR Office of Dam and Safety, these repairs include: removing the current inoperable inlet control and exposed portions of the low level conduit; installing an upstream sluice gate and operations platform; extending the downstream abutment wing walls, removing the deficient left downstream training wall and re-grading and restoring grass on both downstream slopes from the channel to the shoulders near the spillway; remaining downstream vegetation will be removed; excavating, backfilling and properly grading sinkholes along the crest in preparation of the repairs.

The implementation of the proposed repairs will result in a reduction of the current public safety issues. The installation of a new low level outlet works will allow for greater control of the impoundment water level and increased safety for the upstream residents. The installation of the catch basins and curbing along Lake Road will reduce direct runoff from the roadway into the impoundment and downstream areas.

Project Cost:	\$246,891
Funds Requested from EEA:	\$179,949
Funds Awarded:	\$6,750 in grant \$173,199 in loan
Other Funding:	\$66,942 Town of Brookfield
Anticipated Project Completion:	Winter 2015



Applicant:	Town of Canton
Project Title:	Shepard Pond Dam Repairs & Upgrades
Location:	Shepard Pond, Canton
Repair or Removal:	Repair

Description: Originally constructed in the 1880's for mill power, the Shepard Pond Dam now serves as a pond for recreation and wetland preservation. This dam, classified as a significant hazard dam as well as structurally deficient and in poor condition by the DCR Office of Dam and Safety, seeks repairs and upgrades that will transition the dam into a modern engineered structure, significantly improving public safety and greatly enhancing resilience in the face of climate change.

The Shepard Pond Dam has major structural and hydraulic deficiencies that jeopardize dam safety and consequently public safety. These deficiencies include internal erosion and severely inadequate hydraulic capacity that results in overtopping the dam during periods of minimal flooding. These deficiencies significantly increase risks of dam failure, risking loss of life, private property and public infrastructure damage to about 80 residential and commercial downstream structures: Washington Street, utilities (water, sewer, gas, electric), Old Shepard Street Dam and five other streets. Failure of the water main on Washington Street as a result of dam failure would leave 800 homes, an assisted living facility, and strip-malls and other commercial properties stranded without water for drinking or fire suppression as well as without emergency vehicle access. Additionally, the Shepard Pond Dam is plagued by invasive species plants such as the Japanese Knotweed, Purple Loosestrife and Oriental Bittersweet. These invasive species threaten native and naturally occurring plants. The approved project will reinforce public safety while improving the ecology of the Dam.

The overall project goals are to reduce risk of loss of life and property damage (protect public safety) and to preserve the pond by mitigating risk of internal erosion and voids via engineering testing and repairs, making hydraulic and structural repairs and improvements to address overtopping, sinkholes and internal erosion, and removing invasive vegetation.

Project Cost:	\$2,000,000
Funds Requested from EEA:	\$1,000,000
Funds Awarded:	\$665,000 in grant \$335,000 in loan
Other Funding:	\$1,000,000 Town of Canton
Anticipated Project Completion:	Fall 2015



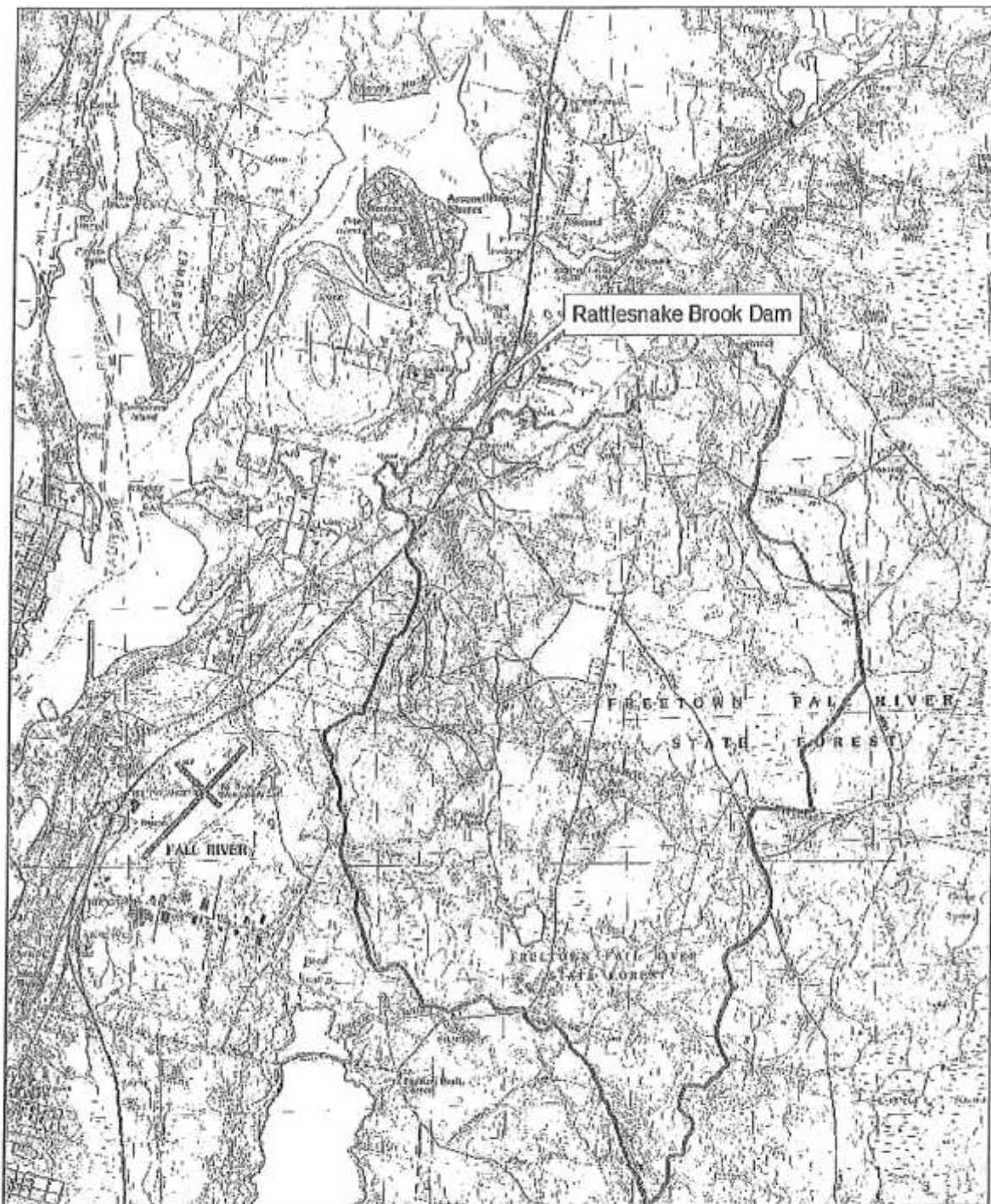
Applicant:	Town of Fall River
Project Title:	Rattlesnake Dam Removal Project – Phase 1 Designs
Location:	Rattlesnake Brook, Freetown
Repair or Removal:	Removal

Description: A 2009 inspection of the Rattlesnake Dam found that the dam was in unsafe condition with a partially breached spillway at the right abutment and a partial breach of the embankment at the left abutment. There is extensive growth of large trees throughout the dam, areas of accumulated debris which compromises water quality and erosion as well as leakage at the primary spillway. Based upon the observations, the dam is not functioning as designed and has the potential for accelerated deterioration.

Given that the dam impounds water for no formal purpose aside from passive recreation and the minimal available freeboards provides little flood attenuation, breaching of the dam is the most practical and viable option to addressing safety and stability concerns at the dam.

The removal of this dam also will have many environmental benefits. The proximity of the project dam to the marine environment presents an opportunity to restore riverine habitat and access for diadromous species, including sea run brook trout, American eel and river herring. Rattlesnake Brook is designated as a coldwater stream by DFW in its upper reaches. DFW periodically stocks the stream with brook trout (*Salvelinus fontinalis*). Currently, the Rattlesnake Brook Dam acts as a barrier to upstream fish passage so this removal will restore the ecological and aquatic habitat, flora and fauna to what how it is intended to be.

Project Cost:	\$56,877
Funds Requested from EEA:	\$46,474
Funds Awarded:	\$46,474 in grant
Other Funding:	\$10,000 The Nature Conservancy \$403 Mass Division of Ecological Restoration
Anticipated Project Completion:	Winter 2014



Legend

 Rattlesnake Brook Dam Watershed

0 325 650 1,300 1,950 2,600 Meters



Applicant:	City of Gloucester
Project Title:	Babson Reservoir Dam Rehabilitation
Location:	Babson Reservoir Dam, Gloucester
Repair or Removal:	Repair

Description: Constructed in the 1930's, the Babson Reservoir serves as the water supply system for the City of Gloucester. This dam shows physical signs of aging; there are numerous large trees growing on the downstream slope of the embankment, significant deterioration of the concrete spillway, core wall and water intake gatehouse and evidence of erosion holes and seepage along the length of the dam. Failing a 2006 visual inspection, the dam was declared in poor condition. A Gloucester Housing Authority elderly housing complex and residential neighborhood are located in the immediate downstream floodway below the dam, creating a public safety hazard if the dam were to breach. This heightened level of hazard to public safety classifies this dam as a high hazard structure.

Repairing the Babson Reservoir Dam will help meet the requirements for the local Conservation Commission and the Department of Environmental Protection (DEP). Environmental benefits include reduced risk of losing the Babson Reservoir impoundment and the associated impacts to adjacent bordering vegetated wetlands around and upstream of the reservoir, as well as reduced risk of sediment transport downstream of the dam and associated environmental damage to brooks, ponds, wetlands and coastal environmental resources downstream.

This rehabilitation project was awarded \$1,000,000 in the form of both a grant (\$146,000) and loan (\$845,000). The design includes replacing the existing chute spillway with a new reinforced concrete baffled chute spillway; the spillway baffles are designed to dissipate the energy of the Spillway Design Flood peak discharge to limit potential damage to features downstream of the dam. The concrete core wall will be raised to provide freeboard above the peak SDF stage in the reservoir. Concrete surfaces of the existing gatehouse will be repaired as well as the protective concrete slab on the upstream slope of the embankment. The downstream embankment slopes will be cleared and grubbed of woody vegetation and root mass. The slopes will be graded for more slope stability and a mineral drainage filter will be incorporated into the downstream slope to help manage seepage through the dam.

Project Cost:	\$1,377,000
Funds Requested from EEA:	\$1,000,000
Funds Awarded:	\$146,000 in grant \$845,000 in loan
Other Funding:	\$377,000 City of Gloucester Department of Public Works
Anticipated Project Completion:	Fall 2014

Q:\Gloucester MA\Babson Reservoir Dam Rehabilitation\Funding Application\Figure 1 - Locus Map.dwg



Figure 1 – LOCUS MAP
Gloucester, Massachusetts
BABSON RESERVOIR DAM

Wester & Sampson

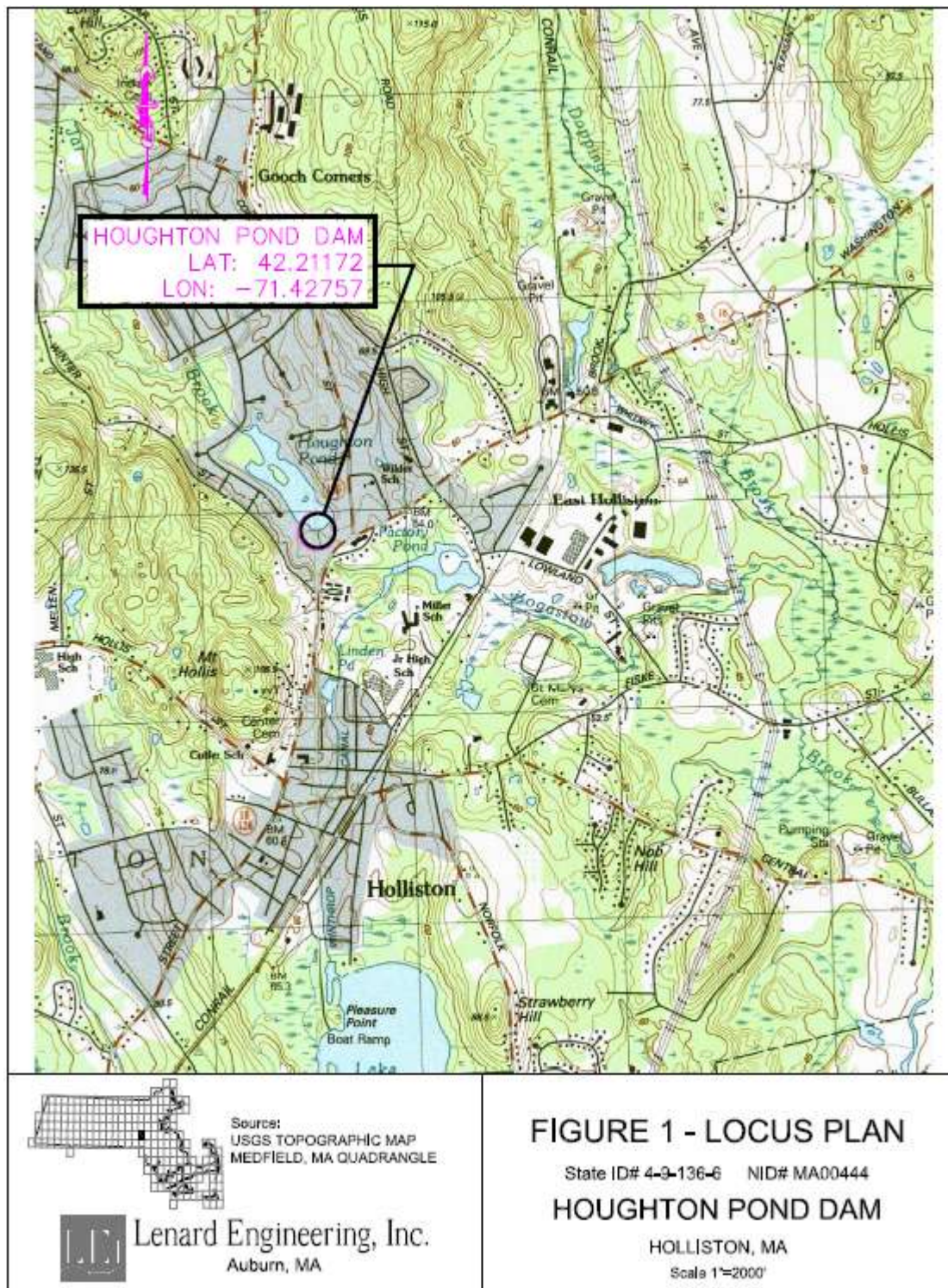
Applicant:	Town of Holliston
Project Title:	Holliston 3 Town Dams Repair Design Project
Location:	Houghton Pond, Lake Winthrop and Factory Pond
Repair or Removal:	Repair

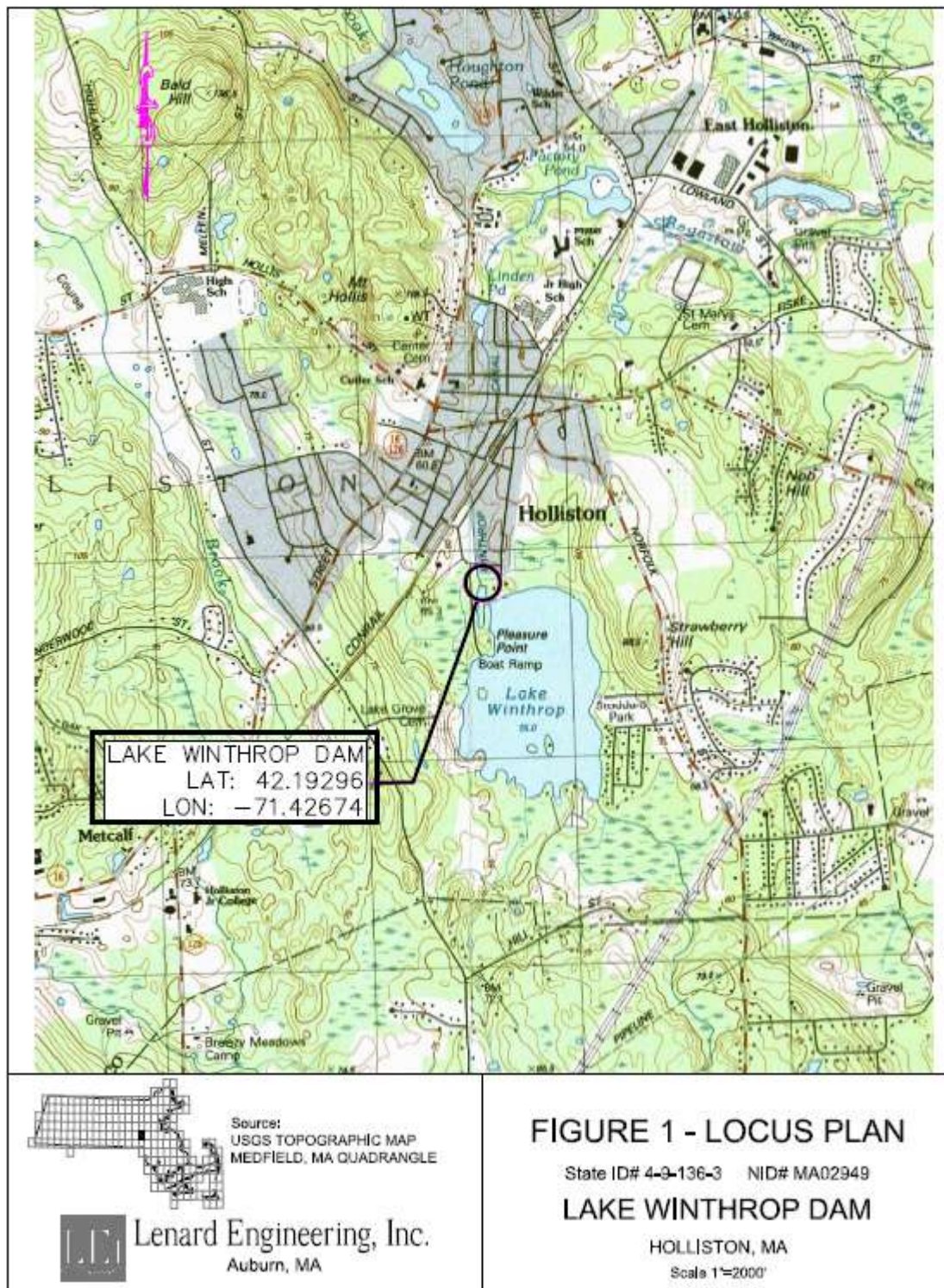
Description: This project seeks to make improvements and upgrades to three dams: the Houghton Pond Dam, the Lake Winthrop Dam and the Factory Pond Dam. The Houghton Pond Dam, classified as a high hazard potential dam, has major deficiencies that will be remedied including deteriorated masonry walls, sinkholes on the crest, missing boulders at the base of channel wall causing sink holes at the top, spalling and cracking of spillway training walls, voids under weir capacity, and lack of low level outlet. This dam lies upstream of several businesses, residences and both public and private facilities making a breach in the dam a threat to public safety.

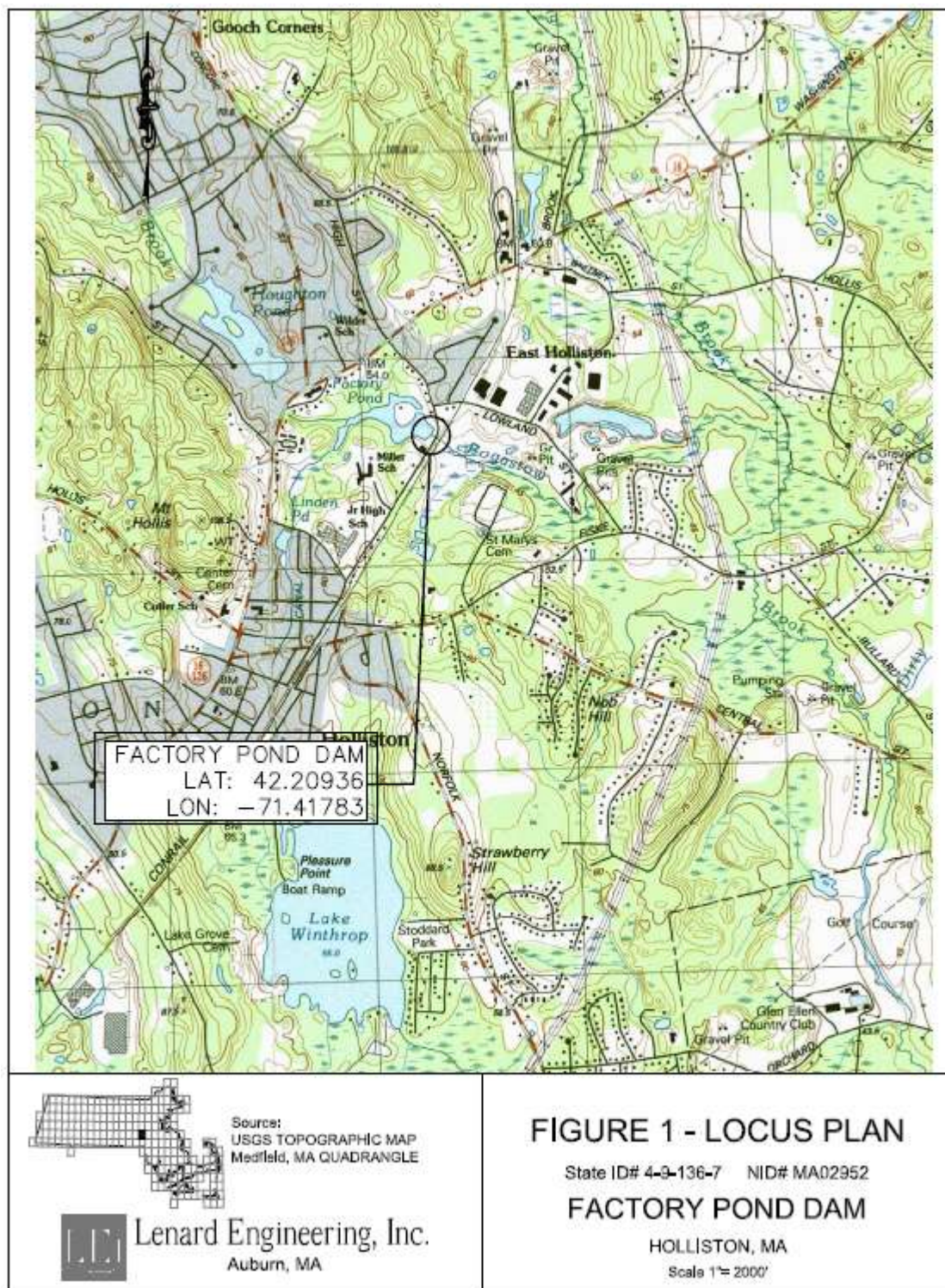
Lake Winthrop Dam, classified with a significant hazard potential, also has major deficiencies that will be remedied through the Dam and Seawall Funds. The areas of improvement include mature trees and heavy brush on the dike and dike area, steep upstream slope, low spots on the crest, erosion of earth behind spillway, a lack of vegetative cover on the dam and dike, debris in the spillway and a void to the left of the spillway. The dam, similar to the Houghton Pond Dam, lies upstream of several streets in the densely developed downtown Holliston area including elementary schools, residences and commercial properties. Should an uncontrolled breach of the dam occur, there would likely be severe damage of the commercial and residential properties.

Factory Pond Dam, a dam with a significant hazard potential, in its current state has no protection on embankments, deteriorated downstream stone masonry wall, deterioration of the forebay concrete and downstream apron and seepages through the concrete cap. This dam lies upstream of many populated streets as well as power transmission lines. All three of these dams and the public safety hazards they pose will be upgraded and improved to meet safety standards.

Project Cost:	\$101,500
Funds Requested from EEA:	\$73,500
Funds Awarded:	\$73,500 in grant
Other Funding:	\$28,000 Town of Holliston
Anticipated Project Completion:	Fall 2015





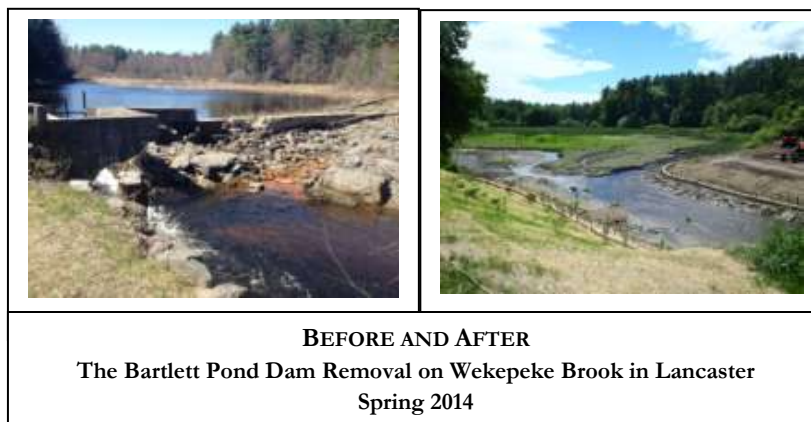


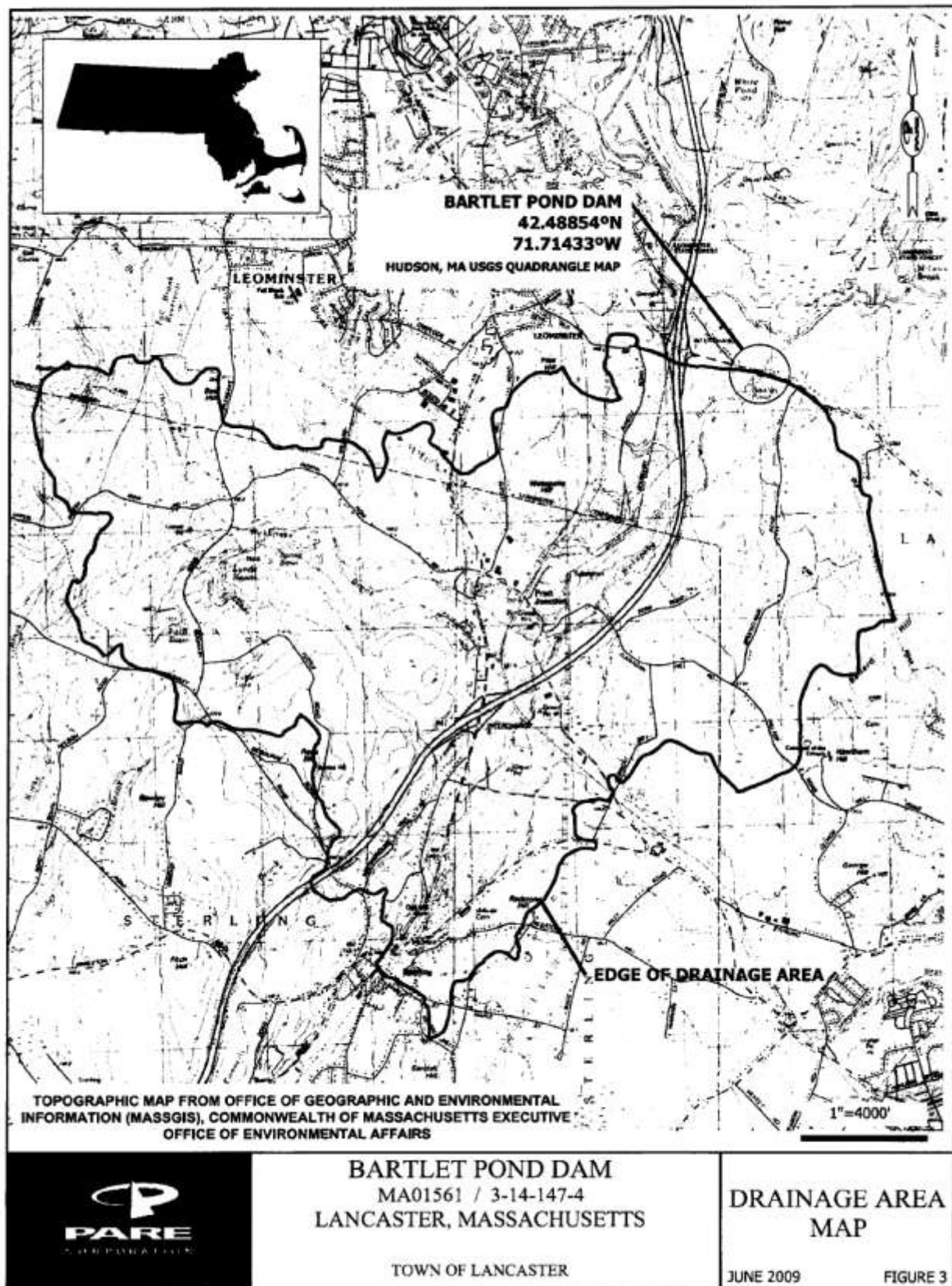
Applicant:	Town of Lancaster
Project Title:	Wekepeke Brook Restoration
Location:	Robert Frommer Conservation Area, Lancaster
Repair or Removal:	Removal

Description: Originally, the Bartlett Pond Dam was constructed to supply power to the Bartlett Chair Factory. The factory was never rebuilt after being destroyed by a fire, making this dam obsolete. DCR had classified the dam as a significant hazard potential dam, causing loss of life and damage of homes, industrial or commercial facilities, secondary highways or railroads if the dam were to fail. Considering there is no more need for this dam, the Town of Lancaster sought to remove the dam. In addition to reinforcing public safety, the dam removal will have a significant positive ecological impact of the Nashua River and Wekepeke Brook. The Wekepeke Brook is a quality coldwater stream with native brook trout, mapped BioMap Core Aquatic Habitat and wetland core habitat located in the watershed. The Bartlett Dam was located at the outlet to the watershed, interrupting the movement of organisms, sediment and organic matter to the Nashua River immediately downstream. This removal project provides upstream fish passage and habitat access, improved water quality and restores river processes that will help create and maintain healthy aquatic habitat.

The very first loan offered from the Dam and Seawall Repair or Removal Fund was executed on 20 May 2014. The work was done swiftly with full removal completed within weeks. By mid-June fish surveys revealed brook trout were already finding their way into the newly formed channel that was once Bartlett Pond, now a restored Wekepeke Brook.

Project Cost:	\$202,000
Funds Requested from EEA:	\$116,000
Funds Awarded:	\$116,000 loan
Other Funding:	\$56,000 Town of Lancaster \$30,000 Mass Division of Ecological Restoration
Project Completion:	Spring 2014





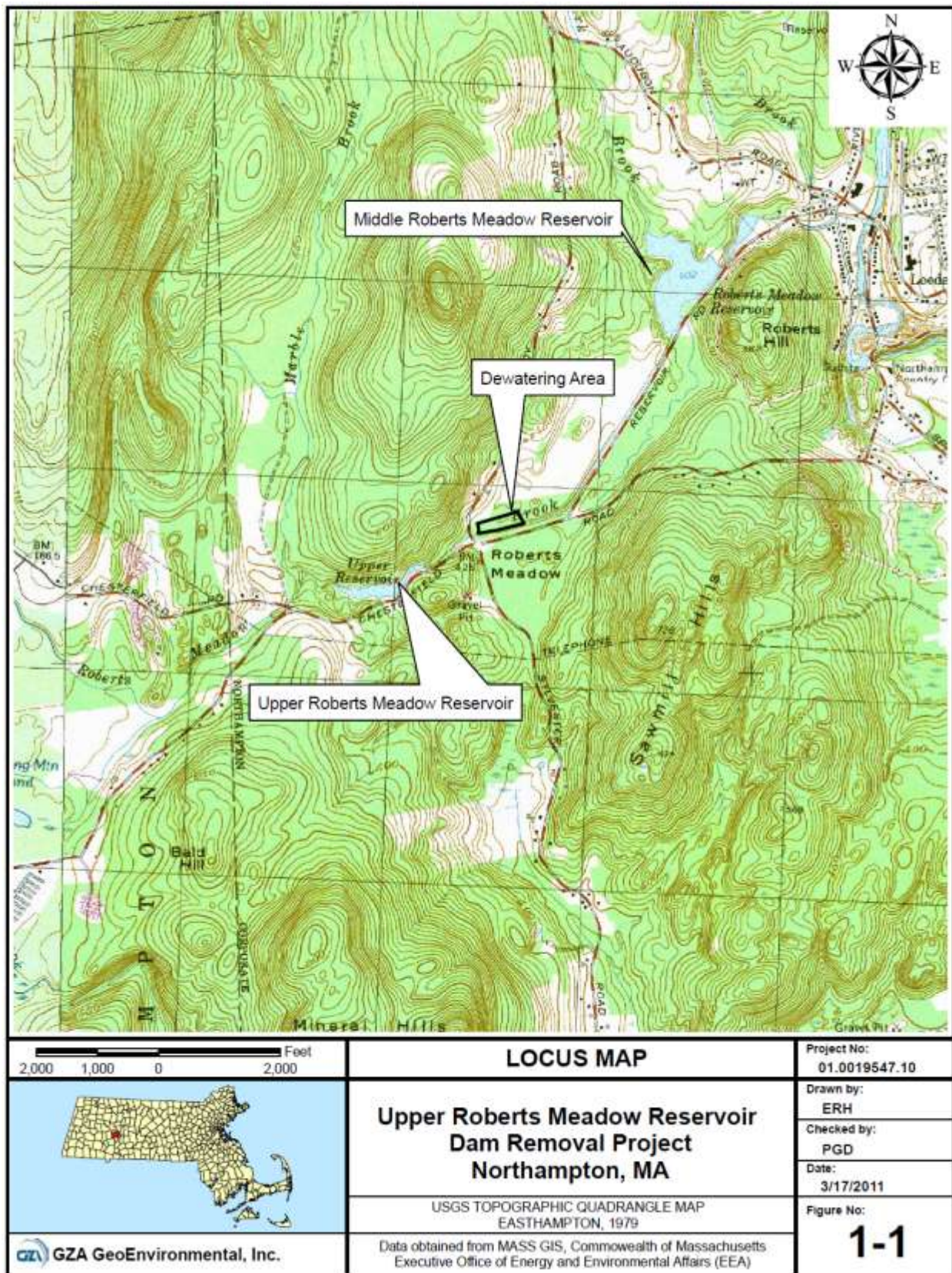
Applicant:	City of Northampton
Project Title:	Upper Roberts Meadow Reservoir Dam Removal
Location:	Village of Leeds, Northampton, Massachusetts
Repair or Removal:	Removal

Description: Constructed in 1883, the Upper Roberts Meadow Reservoir Dam originally was meant to be part of the city's water supply system. Currently, the Upper Roberts Meadow Reservoir has no capacity or potential to provide water supply, even on an emergency basis. Therefore, the dam currently serves no purpose relative to the water supply.

In addition to this dam being obsolete, it has been rated as poor and unsafe since the 1970's by the Massachusetts Department of Public Works (DPW) because of significant leakage through the dam, embankment, and abutments. Further, the structure does not meet current design standards relative to structural stability and hydraulic capacity.

The removal of this dam and restoration of the reservoir basin will allow an obsolete structure to provide a multitude of long-term benefits to local resources. The long term benefits include: restoration of connectivity of Robert Meadow Brook to allow migration of brook trout and other aquatic organisms from the lower segmented portion of the brook to the upper reaches of the brook, restoration of natural flow patterns, reestablishment of natural sediment and nutrient transport, improvement of water quality and enhancement of habitat value and long-term sustainable benefits for aquatic organisms. This project will improve public safety, ecological quality and recreational opportunity.

Project Cost:	\$236,000
Funds Requested from EEA:	\$75,000
Funds Awarded:	\$75,000 in grant
Other Funding:	\$161,000 from the City of Northampton
Anticipated Project Completion:	Spring 2015



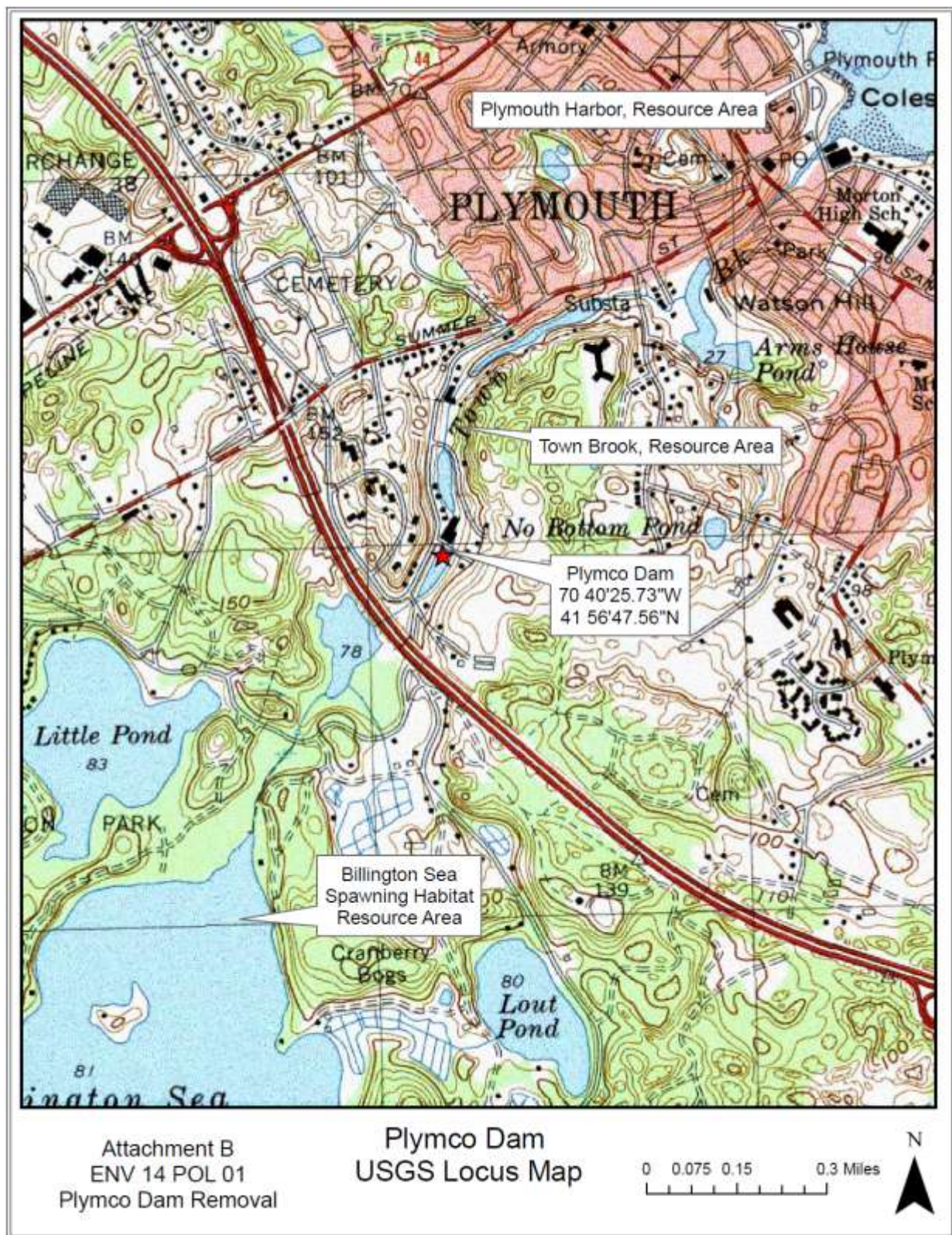
Applicant: Town of Plymouth
Project Title: Plymco Dam Removal, Town Brook
Location: Plymouth
Repair or Removal: Removal

Description: The removal of the Plymco Dam is an important component of a comprehensive interagency initiative to restore Town Brook and is also on DER's list of priority restoration projects. The Plymco Dam, as well as other historic dams in the area along Town Brook, has significantly degraded fish passage and impacted ecological processes in the local river system.

By removing dams along Town Brook over 1.5 miles of river will be opened for fish passage including access to Billington Sea, a 269-acre pond that supports critical spawning habitat. There will also be improvements to floodplain connectivity, riparian wetland habitat and water quality.

With the full removal of the Plymco Dam and the restoration of natural flow, temperature and sediment transport processes, the habitat is expected to revert to a self-sustaining condition. This will include the establishment of a natural streambed with pools and riffles and the restoration of forested riparian habitat. This will contribute to channel development, providing shade, cover, food and habitat for all life stages of resident and migratory fish species. The removal of the dam will also increase public safety by removing safety hazards associated with the high hazard dams and eliminate maintenance costs.

Project Cost: \$1,369,743
Funds Requested from EEA: \$730,743
Funds Awarded: \$730,743 in loan
Other Funding: \$114,000 American Rivers Association
\$525,000 NOAA
Anticipated Project Completion: Spring 2015



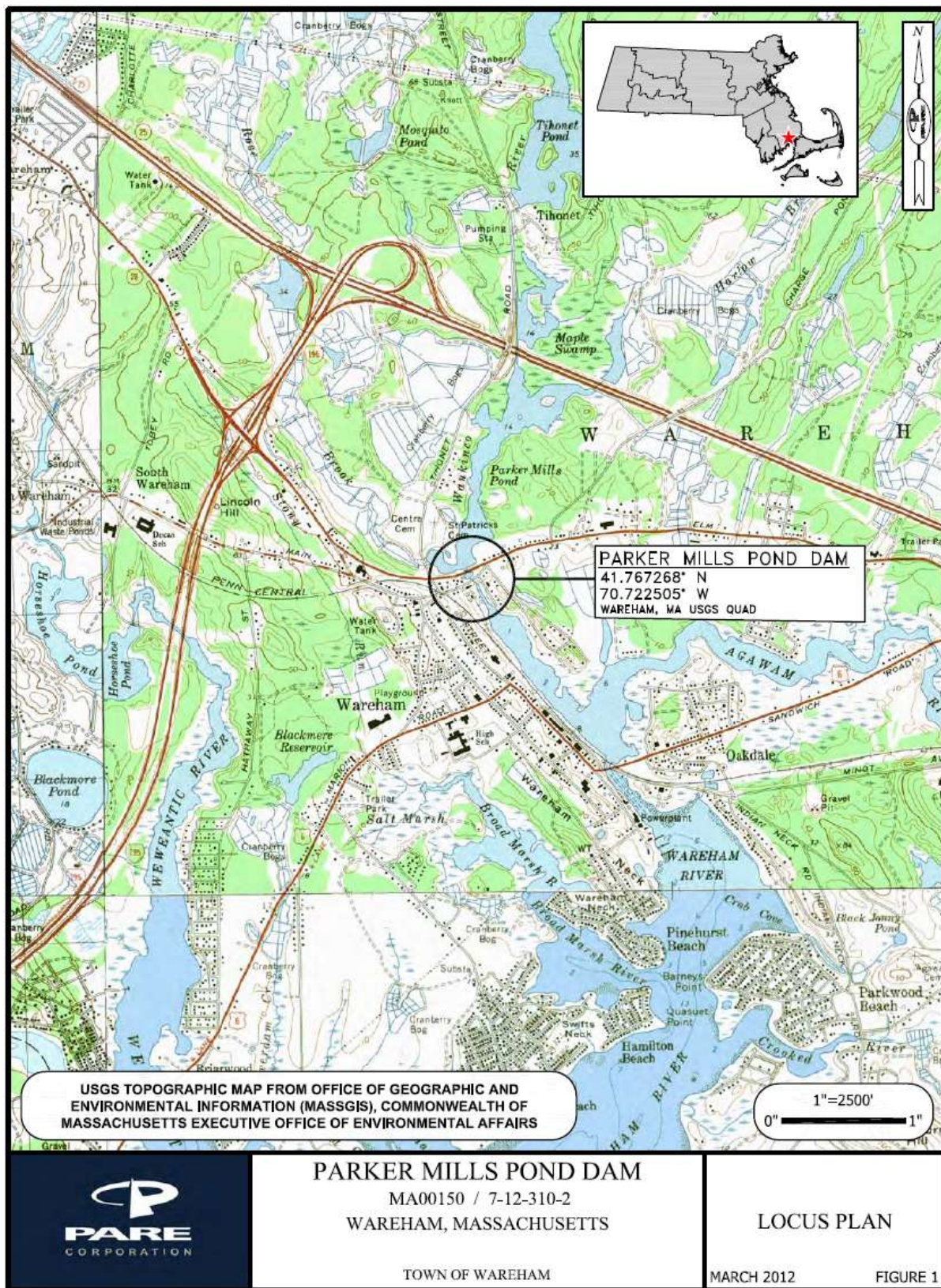
Applicant:	Town of Wareham
Project Title:	Parker Mills Pond Dam Rehabilitation
Location:	Wareham
Repair or Removal:	Repair

Description: The Parker Mills Dam faces a multitude of repairs in order to maintain public safety. Recent inspection of the dam found the dam in poor condition with displaced and unstable upstream wall sections, sinkholes and leakage along the mill building intake system, deterioration of concrete and construction joints at the auxiliary spillway, deterioration of concrete at the primary spillway, large tree and vegetation growth along the dike embankment, stump and brush growth within the upstream stone wall and several depressions along the back of the upstream wall.

This dam has high hazard potential due to the risk of potential damage to more than 80 residential properties, damage to more than 12 residential and secondary roadways and risk of loss of life due to inundation of these areas. Failure of the dam would also impact the Tremont Nail Factory District, added to the National Register of Historic Places as a place worthy of preservation in 1976. .

This rehabilitation project includes developing a monitoring program, undertaking required maintenance activities including clearing trees and unwanted vegetation as well as repairing leaks and cracks in the auxiliary spillway/fish ladder walls, reconstructing the upstream wall and removing the existing mill building intake culverts amongst other improvements.

Project Cost:	\$1,200,000
Funds Requested from EEA:	\$1,000,000
Funds Awarded:	\$164,995 in grant \$835,005 in loan
Other Funding:	\$200,000 Town of Wareham
Anticipated Project Completion:	Spring 2015



Applicant: City of Westfield
Project Title: Granville Reservoir Dam Repair Project
Location: Westfield
Repair or Removal: Repair

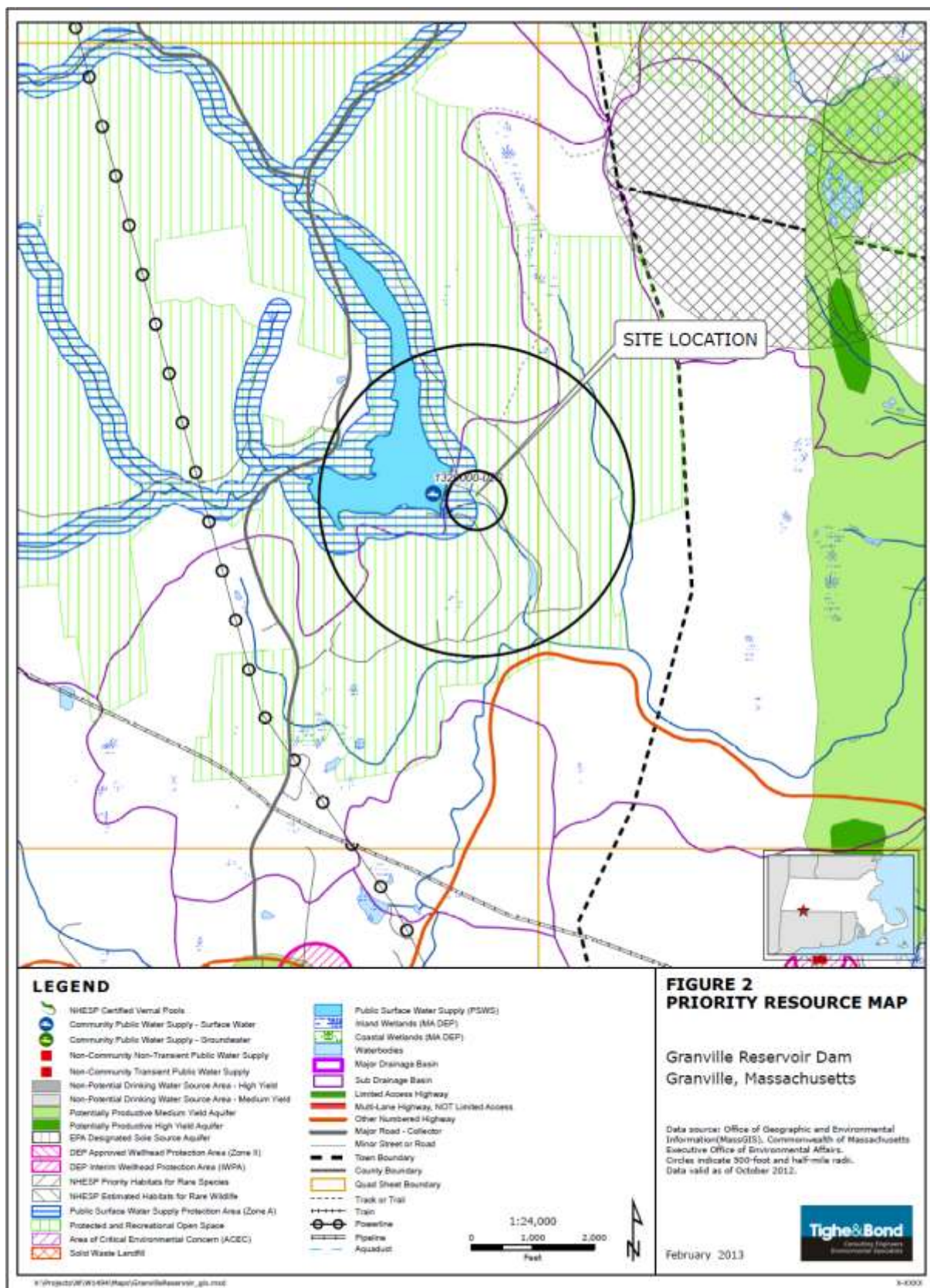
Description: During Tropical Storm Irene in 2011, discharges from the dam's spillway exceeded three feet in depth, resulting in high flow and velocity down the spillway discharge channel. This super elevation in water surface overtopped a portion of the channel causing the dam to fail. While emergency repairs were done then, the Granville Reservoir Dam still needs significant and substantial repair.

The Granville Reservoir serves as a primary public water supply for the City of Westfield and provides water to approximately 50 percent of the population. As dam is vital in supporting its community and is classified with high hazard potential, it is paramount for public safety that this dam be repaired. Planned repairs include replacement of the curved section of the spillway channel (including the failed portion) as well as a variety of repairs and improvements that have been recommended through past inspections and studies. Other repairs and improvements include flattening the downstream slope, raising the dam's spillway training walls, replacing embankment stormwater collection infrastructure, clearing woody vegetation, installing filter blankets on downstream slope and repaving the roadway on the dam's crest amongst other repairs.

Repair of the spillway and improvements to the dam will improve the structure and operation of the dam, as well as minimize the potential for failure. If failure of the dam were to occur again, more than 2,600 properties would be impacted and the city would lose its primary drinking water source.

On June 25, 2014 a \$1,000,000 loan was executed between EEA and the City of Westfield. At a rate of 2 percent, the total cost of the loan over twenty years to the city will be \$1,217,668.36. Payments will be made semi-annually until June 2034.

Project Cost: \$3,452,400
Funds Requested from EEA: \$1,000,000
Funds Awarded: \$1,000,000 in loan
Other Funding: 2,452,400
Anticipated Project Completion: Fall 2014



Applicant:	City of Worcester
Project Title:	Poor Farm Pond Dam Removal
Location:	Poor Farm Brook, Shrewsbury, Massachusetts
Repair or Removal:	Removal

Description: The Poor Farm Pond Dam was constructed in the early 1800's, possibly to irrigate a farm adjacent to the dam. The removal of this obsolete dam is both cost-effective and ecologically sound. This aged dam is judged to be in poor condition due to severe erosion of right abutment, several trees and stumps throughout the embankment, damaged riprap spillway apron, cracked or deteriorated concrete features and failure of the downstream end of the right masonry training wall. The Poor Farm Pond Dam also interrupts the migration of resident species to upstream spawning and nursery habitat. Removal of the existing dam will transform the existing slow moving water body into a flowing stream with improved water quality and lower water temperatures.

The removal process will result in a natural 14-foot wide channel that promotes fish and other aquatic life health and is equipped to deal with a 100 year flood. The removal of the dam will restore natural fluvial processes and improve riparian habitat in the dam impoundment and the adjacent reaches of the brook, as well as increase dissolved oxygen levels downstream to Lake Quinsigamond.

This removal will also improve the flood control and damage prevention. The upstream impoundment will be replaced over time by a vegetated wetland that can moderate flow and absorb floodwaters. Dam removal also eliminates the potential risk of catastrophic dam failure resulting in uncontrolled release of floodwaters and potential downstream flooding.

Project Cost:	\$980,000
Funds Requested from EEA:	\$240,000
Funds Awarded:	\$240,000 in grant
Other Funding:	\$740,000 City of Worcester
Anticipated Project Completion:	Fall 2016

Indicative Project Summaries

Dam and Seawall Repair or Removal Fund

Category 2: Seawalls, coastal flood and/or wave
control structures

Applicant:	Town of Hull
Project Title:	Stoney Beach Seawall Construction
Location:	Stoney Beach Seawall, Hull
Repair or Removal:	Repair

Description: Built in 1934, the Stoney Beach Seawall, located within a 100 year flood velocity zone according to the most recent Flood Insurance Rate Maps, has seen repairs in 1979, 1989, 1992 and 2011. Recent storm damage, in particular from Hurricane Sandy and the two blizzards that occurred in February 2013, has resulted in accelerated deterioration of the coastal protection structure, which has resulted in DCR condemning the structure. As part of the proposed project, the top elevation of the existing seawall will be increased from an elevation of 8.5 feet to an elevation of 12.5 feet, accounting for future sea level rise.

Inspection of the wall reveals numerous areas where the armor stones have raveled, leaving large voids in the face of the wall, and major sections of the wall have moved and settled. The main purpose of a seawall is to protect existing infrastructure from wave action. This wall is currently no longer able to dissipate waves during storm events leaving critical infrastructure more susceptible to damage and erosion.

The Stoney Beach Seawall provides protection to the Towns Wastewater Treatment Plant, residential homes and Nantasket Avenue. Nantasket Avenue serves as the sole connector from Hull Village and Pemberton point to the rest of Hull and Massachusetts. If Nantasket Avenue were to be compromised, this loss of access would prevent emergency vehicles from serving over 400 homes, the Jacobs Elementary School, Hull High School, the Point Allerton Coast Guard Station, Fort Revere Park, the Hull Village Cemetery and the Hull Public Library. Additionally, the Wastewater Treatment Plant, which receives influent from over 5,000 residencies, is located less than 200 feet from this wall; failure of the force main and/or flooding of the Treatment Plant could result in significant environmental damage and health hazards due to the discharge of large volumes of untreated sewage.

This project will provide a modern shape to the wall that will better adapt to wave and storm action, improving the protection of Hull's residents and critical infrastructure. One portion of this wall has deteriorated less than the other portions; in the area where the revetment remains intact, the wall will be repaired by removing and resetting the armor stone to restore the foreslope to a smooth face. The remaining, deteriorated portion of the wall will be reconstructed. Existing armor stone will be removed to allow the installation of a new base stone and filter fabric, and then the armor stone will be replaced as necessary to construct the wall to modern design standards.

Project Cost:	\$3,000,000
Funds Requested from EEA:	\$3,000,000
Funds Awarded:	\$2,750,000 in grant
Other Funding:	N/A
Anticipated Project Completion:	Summer 2015



Applicant:	Town of Marshfield
Project Title:	Hewitts Point Seawall Revetment Repair – South
Location:	Marshfield,
Repair or Removal:	Repair

Description: The existing seawall at Hewitt’s Point was originally constructed before 1940 and is now in need of stabilization and repair. This seawall has seen repairs in 1945 and 1956. In 1956 a grouted riprap revetment outshore of the seawall with steel sheetpiles at the toe was added. This grouted riprap revetment has since been repaired numerous times but is now badly deteriorating and becoming undermined. The undermining is causing sinkholes to open in the riprap which poses a safety hazard to beach users, and will impact the seawalls stability during storm conditions and endanger the functionality of the seawall.

The seawall is the final line of defense preventing waves from washing away the adjacent roadway or damaging dense residential areas immediately inshore of the roadway. This roadway is the primary access through the area, connects two communities, serves as an evacuation route during storms and supports water, sewer, gas electricity and telephone lines.

The proposed reconstructed revetment would completely remove the existing grouted riprap and sheetpiles, replacing it with a placed armor stone revetment. The reconstructed revetment would be at a finished slope of one vertical to two horizontal, consisting of a filter fabric layer with graded stone layers placed over the top. Individual armor stone size, restricted to eight to nine tons, allow some factor of safety for the single layer of armor. The grading of the stone is designed to avoid the loss of underlying stone in the future.

Wall stability is also a concern and the proposed cross section will add a concrete toe as required to ensure full support of the existing wall at the toe. The sinkholes behind the wall will be addressed by excavating to a depth of approximately eight feet behind the wall, placing geotextile against the wall and backfilling with existing material. This will minimize future migration of fine material and reduce the risk of sinkhole formation.

Project Cost:	\$1,591,800
Funds Requested from EEA:	\$506,000
Funds Awarded:	\$488,000 in grant
Other Funding:	\$29,960 Town of Marshfield
Anticipated Project Completion:	Fall 2014



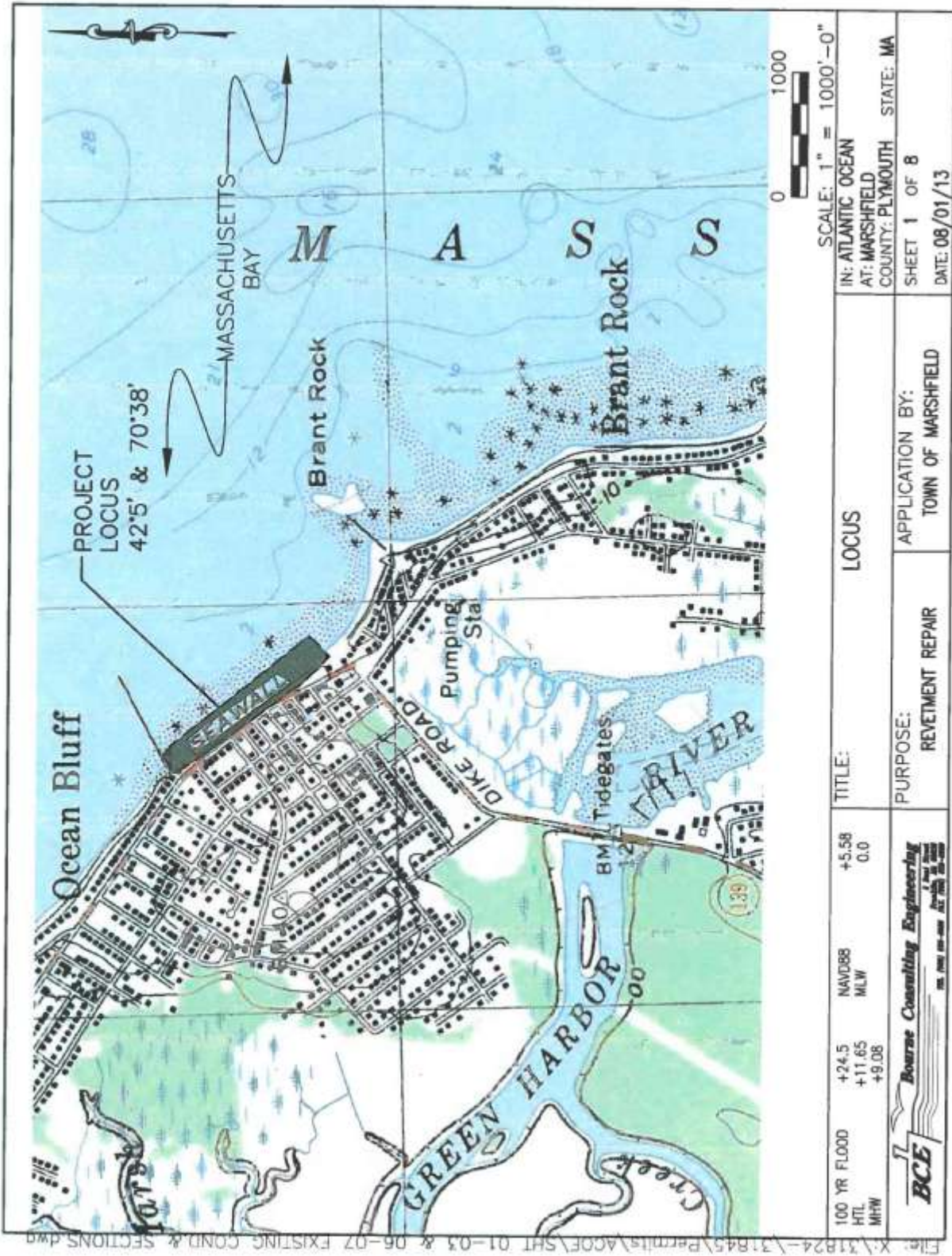
Applicant:	Town of Marshfield
Project Title:	Hewitts Point Seawall Revetment Repair - North
Location:	Marshfield, Massachusetts
Repair or Removal:	Repair

Description: Originally constructed before 1940, Hewitt's Point Seawall is in need of repair and stabilization. This seawall acts as the final line of defense by preventing waves from washing away the adjacent Ocean Street roadway or damaging dense residential areas that are immediately inshore of the roadway. Ocean Street is the primary access lane through the area connecting the Brant Rock and Ocean Bluff communities with major state highways further inland. The roadway is also a critical evacuation route during storms and supports water, sewer, gas, electricity and telephone lines.

In addition to the deterioration of the riprap, sinkholes are opening in the stone paved slope behind the seawall all along its length. These sinkholes create a safety hazard and could undermine the adjacent sidewalk and roadway. The Town of Marshfield is now proposing to stabilize the existing seawall through reconstruction of the revetment.

Construction of this portion of revetment is more straightforward than for the reconstruction of the south revetment because almost all of the proposed construction is inshore of the existing Mean High Water line and operations will have less tidal constraints. The proposed reconstructed revetment would be at a finished slope of one vertical to three horizontal and would consist of a filter fabric layer with graded stone layers placed over the top. Individual armor stone size is anticipated at three to four tons. The grading of the stone is designed to avoid the loss of underlayer stone in the future. Surplus existing armor stone from the south revetment could be moved to this area and utilized for the new revetment construction. A larger toe stone with minimum weight of five tons will be used to provide additional stability. All excavated material will be replaced over the completed revetment slope

Project Cost:	\$790,000
Funds Requested from EEA:	\$790,000
Funds Awarded:	\$760,000 in grant
Other Funding:	30,000 Town of Marshfield
Anticipated Project Completion:	Fall 2014



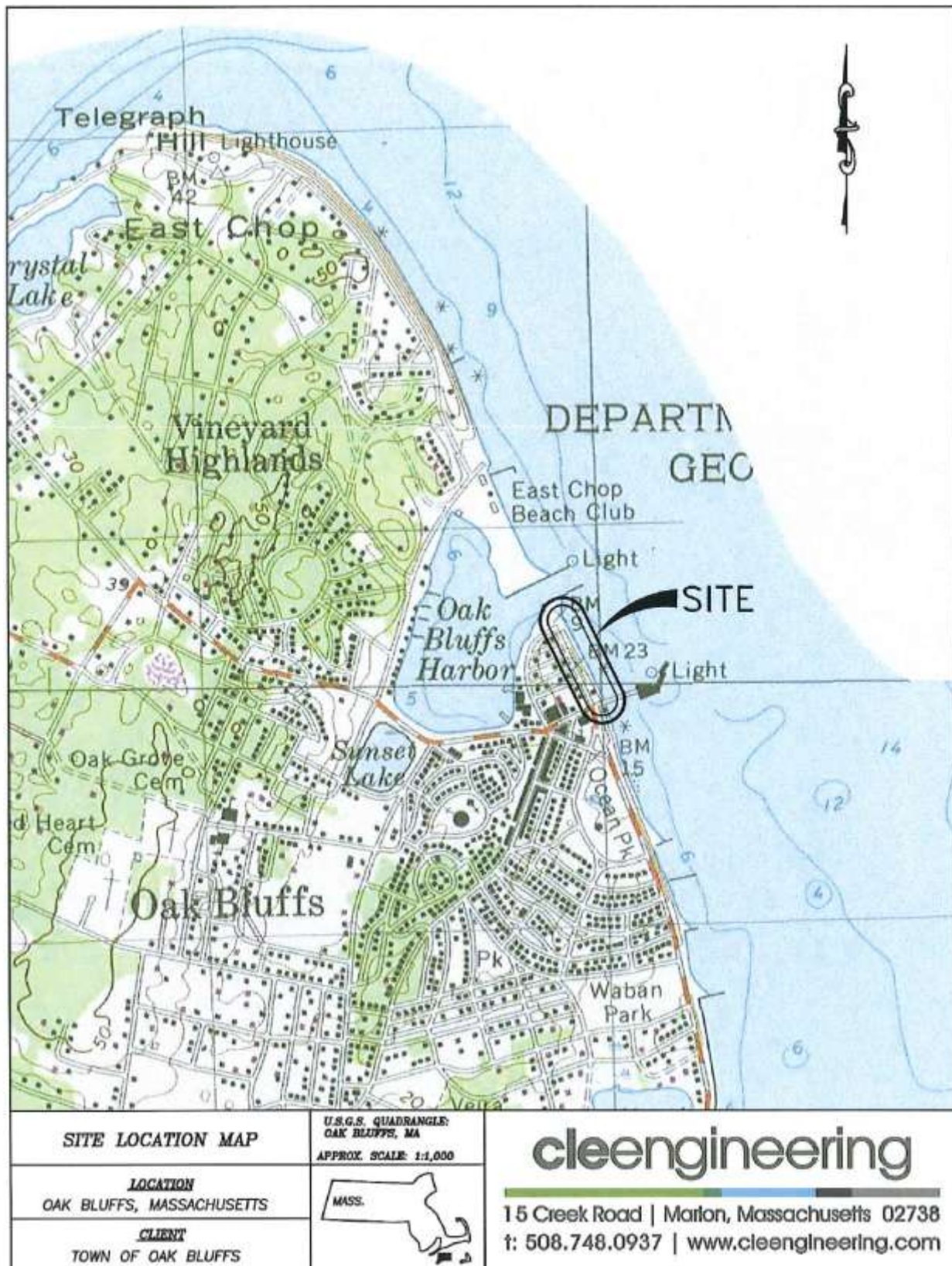
Applicant:	Oak Bluffs
Project Title:	North Bluff Seawall Rehabilitation Project
Location:	Town of Oak Bluffs, Massachusetts
Repair or Removal:	Repair

Description: The existing North Bluff Seawall, which consists of a concrete seawall, stone revetment and unarmored coastal bank, extends approximately 720 linear feet along Sea View Avenue Extension. This shoreline structures provides protection to the public roadway and associated utilities as well as adjacent private properties. Sea View Avenue Extension ties into Sea View Avenue and collectively this public access way provides a direct conduit to the waterfront which supports commercial ferry service, commercial, recreational and transient boaters, fishermen, beach goers, bicyclists, swimmers, rowers, walkers and hundreds of thousands of annual visitors. These activities prove to be vital components for generating revenue for the town as well as private businesses situated along the waterfront and within the downtown area.

The primary objective of the proposed project is to restore coastal protection and protect public infrastructure, access and safety along Sea View Avenue Extension. . Without implementation of this project, the existing coastal bank will continue to erode and compromise the vital seawall. Continued loss of coastal bank negatively impacts the slope stability of the material supporting the roadway.

Future storm events and/or loading conditions along the roadway threaten additional failure of the coastal bank and the collapse of the roadway. The proposed project plan is consistent with maintenance practices that have been implemented at this site by the town and state since the 1930s. Recent storm damage, in particular from Hurricane Sandy and the two blizzards of February 2013 have resulted in the accelerated and critical deterioration of the coastal protection structures, resulting in DCR condemning the structure. To account for future sea level rise, the top elevation of the existing seawall will be increased from elevation 8.5 feet to elevation 12.5 feet. .

Project Cost:	\$6,000,000
Funds Requested from EEA:	\$4,000,000
Funds Awarded:	\$3,600,000 in grant
Other Funding:	Seaport Council
Anticipated Project Completion:	Fall 2015



Applicant:	Town of Rockport
Project Title:	Pigeon Cove Break Water Repairs
Location:	Sandy Bay, Rockport
Repair or Removal:	Repair

Description: Pigeon Cove is located in Rockport, Massachusetts along Sandy Bay. It is a protected harbor that is home to the Pigeon Cove Fisherman's Co-Op and recreational boating. Two breakwaters protect the cove and the adjacent residential and commercial properties. The granite stone land connected upper breakwater is approximately 1,000 feet long by 15 feet high with a 1-to-1 side slope on both sides and provides easterly shelter from the Atlantic Ocean. The breakwater extends down to the riprap slope on the east side to the ocean and down to an access road for the Co-Op on the west side. The granite block entrance break water is approximately 320 feet long by 15 feet high and provides the cove with shelter from waves from the southeast.

Damage to these structures was sustained during the period of strong storm surge from March 12 to April 26, 2010. Near the outer one-third of the upper breakwater, the crest of the breakwater was compromised with loss of armor stone on the ocean side slope. At the entrance breakwater, damage consisted of unraveling at its mid-section and both ends. Before the town could repair these structures, they were further damaged by the February 2013 blizzard. The partial loss of armor stone increased to a breach in the structure. There are now nine additional zones with signs of damage consisting of loss of armor stone and altered slope.

Repairs include reconstructing the breached portion of the breakwater and resetting and replacing granite stones and base material at other damaged areas. Reconstruction and repair of the breakwaters will re-establish and potentially improve the level of protection from storm events and associated waves that these structures provide to Pigeon Cove, the Pigeon Cove Fisherman's Co-Op operations, the adjacent properties, and the town's roadway and infrastructure systems. Provisions will be made to incorporate projected sea level rise, climate change effects, and the preliminary revisions for the Federal Emergency Management Agency (FEMA) flood insurance rate maps.

Project Cost:	\$1,250,000
Funds Requested from EEA:	\$14,000
Funds Awarded:	\$14,000 in grant
Other Funding:	\$1,236,000 from FEMA and local funds
Anticipated Project Completion:	Fall 2014

